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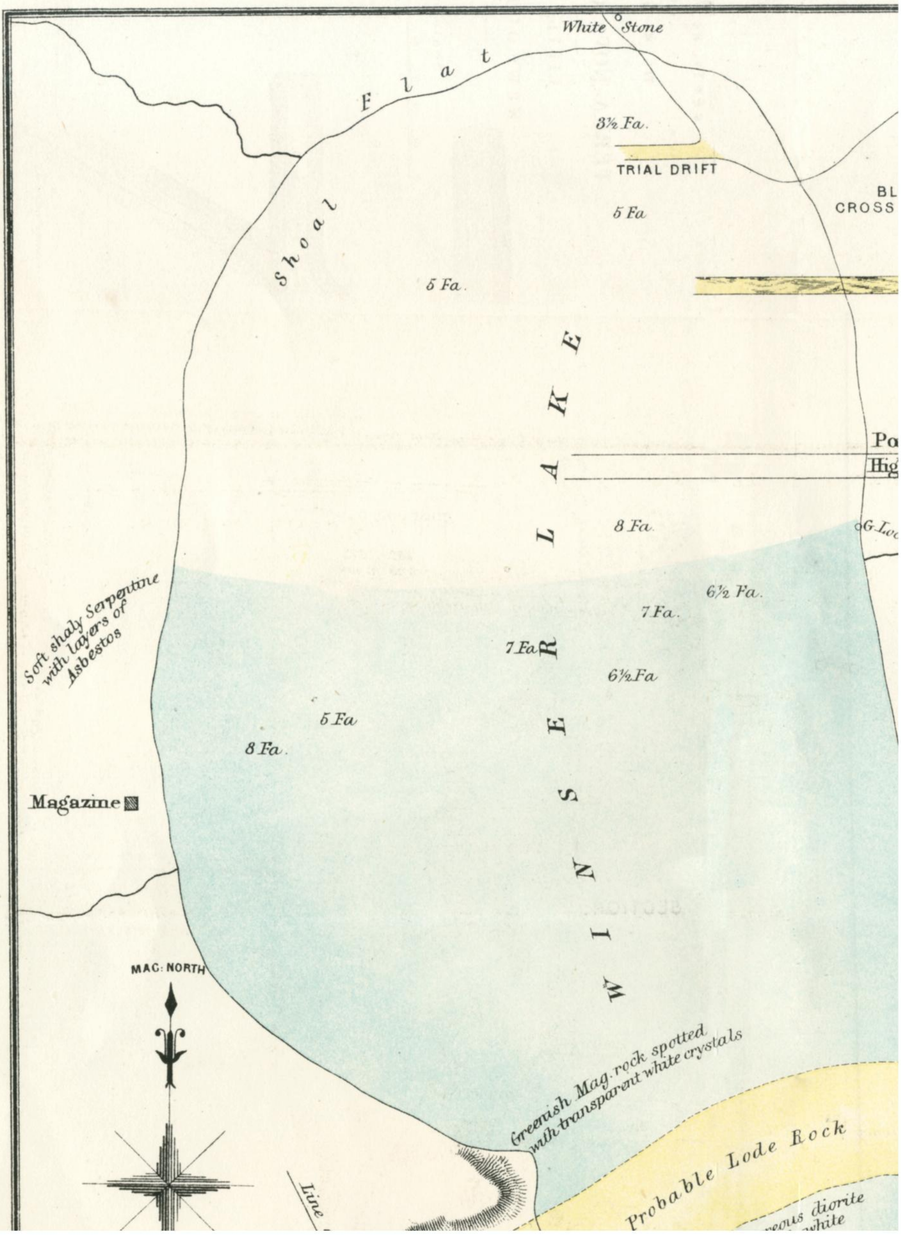
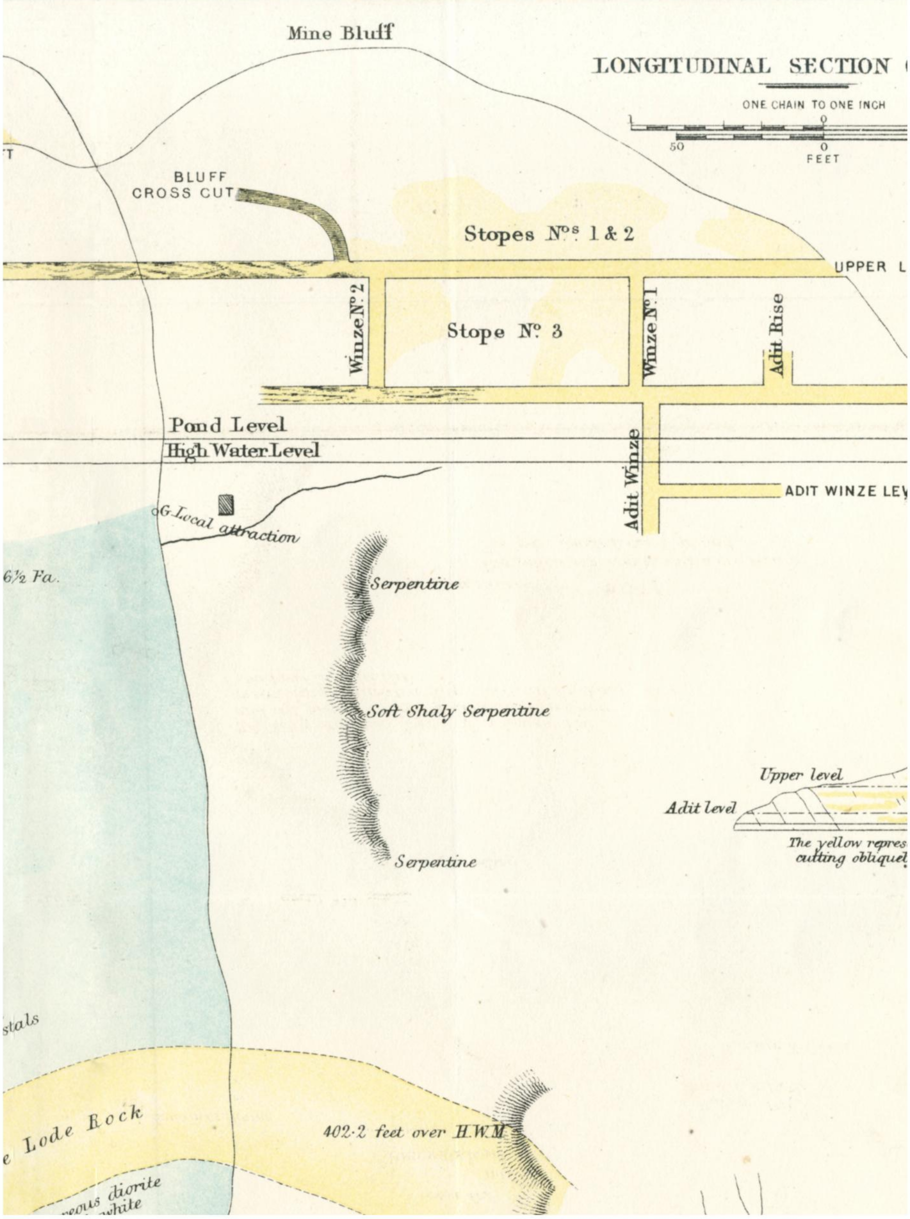
UNION

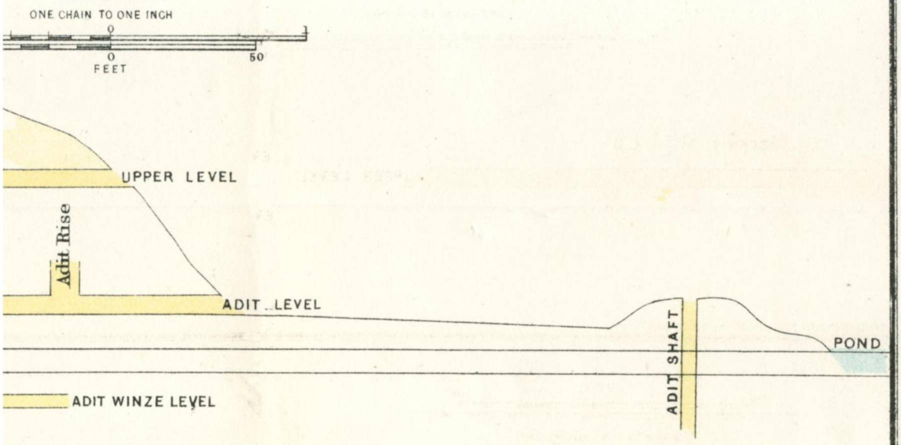

White Stone
Shoal Flat
3½ Fa.
TRIAL DRIFT
BL
CROSS
5 Fa
5 Fa.
WINSEE LAKE
Pa
Hig
8 Fa.
G.Lo
6½ Fa.
7 Fa.
7 Fa.
6½ Fa
5 Fa
8 Fa.
Soft shaly Serpentine with layers of Asbestos
Magazine ▨
MAC: NORTH
Greenish Mag. rock spotted with transparent white crystals
Probable Lode Rock
Line
reous diorite
white

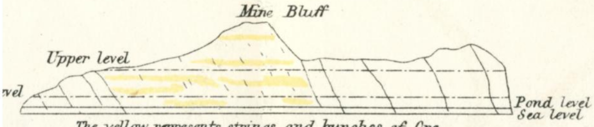
UNION MINE, TILT COVE, NEWFOUNDLAND.



LAND.

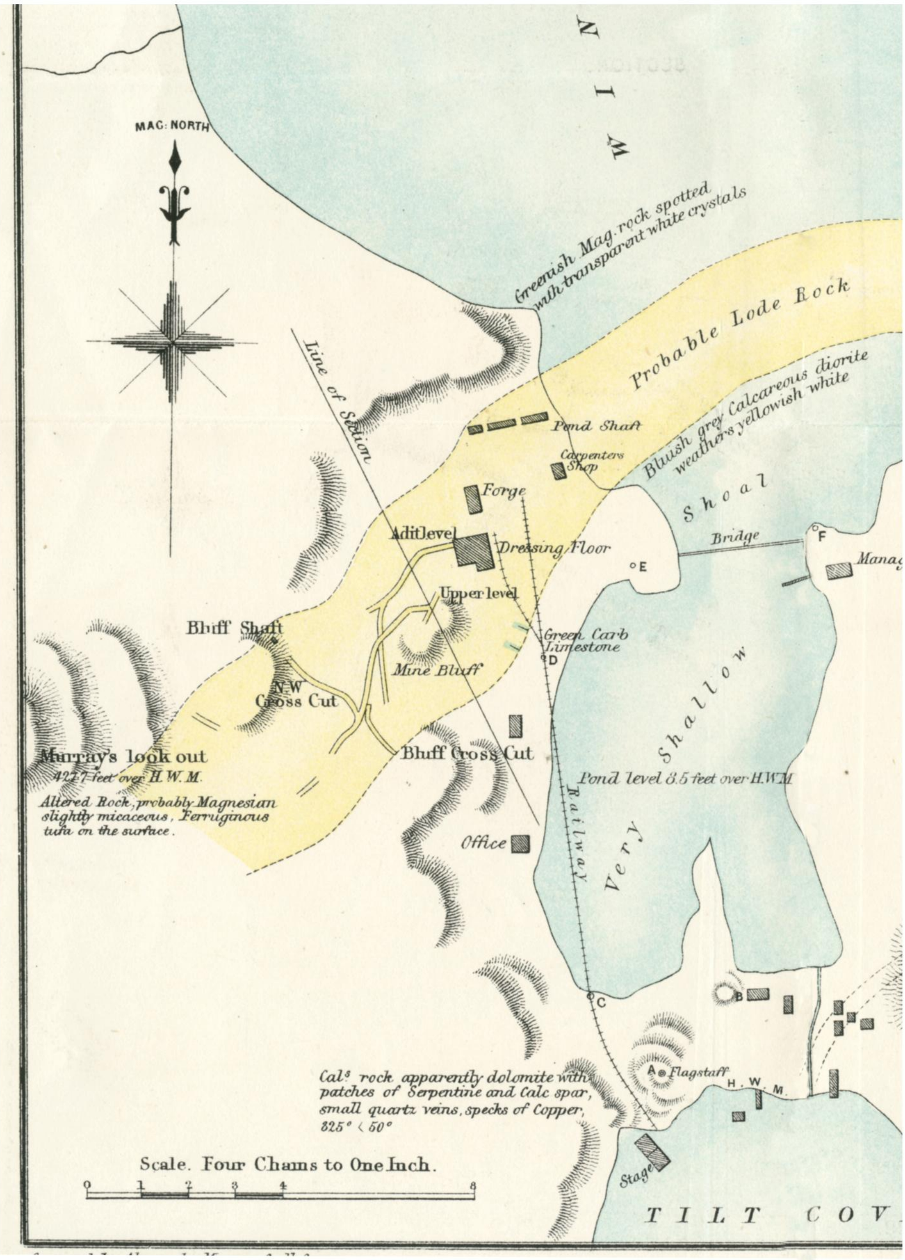
INAL SECTION OF LEVELS

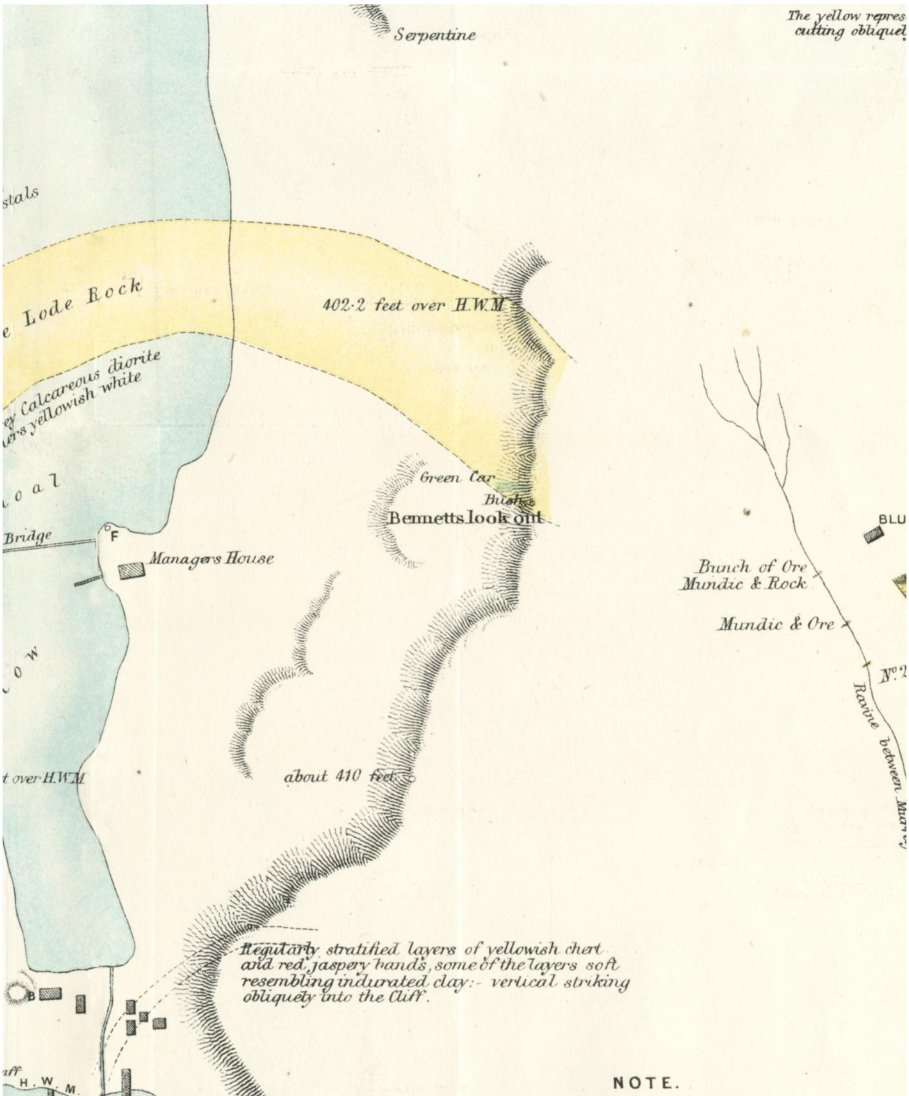




The yellow represents strings and bunches of Ore cutting obliquely across the stratification.

SECTION.


N
I
M
MAG: NORTH
Greenish Mag. rock spotted with transparent white crystals
Probable Lode Rock
Bluish grey Calcareous diorite weathers yellowish white
Line of Section
Pond Shaft
Carpenters Shop
Forge
Shoal
Bridge
F
Manag
Adit level
Dressing Floor
E
Upper level
Bluff Shaft
Green Carb Limestone
D
Mine Bluff
N.W Cross Cut
Very Shallow
Bluff Cross Cut
Murray's look out
427.7 feet over H. W. M.
Altered Rock, probably Magnesian slightly micaceous, Ferruginous tufa on the surface.
Pond level 8.5 feet over H.W.M.
Railway
Office
C
B
A
Flagstaff
H. W. M.
Cal^s rock apparently dolomite with patches of Serpentine and Calc spar, small quartz veins, specks of Copper, 325° ‹ 50°
Stage
Scale. Four Chains to One Inch.
0
1
2
3
4
8
TILT COV

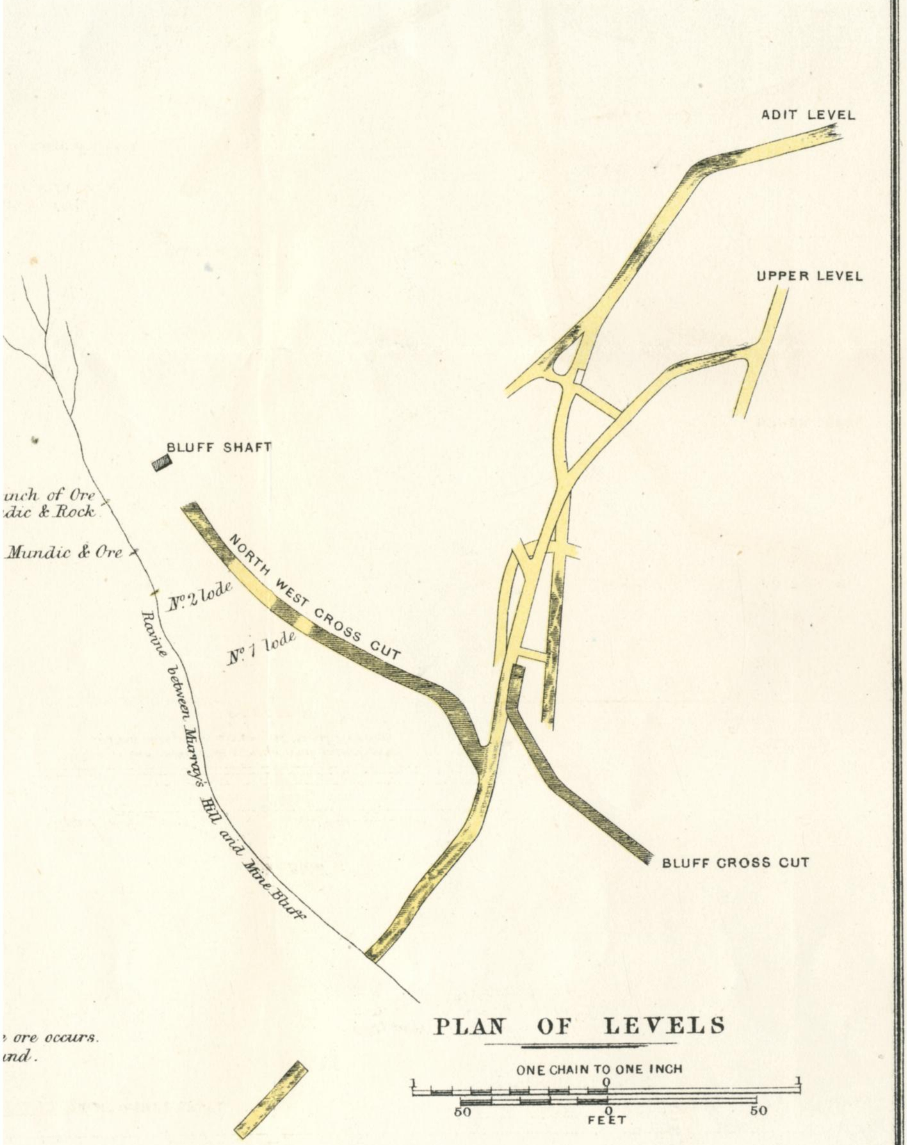


NOTE.

The yellow represents where ore occurs.
The part shaded, dead ground.

The yellow represents strings and bunches of Ore cutting obliquely across the stratification.

SECTION.



PLAN OF LEVELS

Stanfords Geographical Establishment

Journal of the Society of Arts.

FRIDAY, OCTOBER 11, 1867.

PARIS EXHIBITION.

The weather, or the condition of trade and of the money market, or both combined, are having a sad effect on the interest of the guarantors of the Exhibition; the number of visitors which it was expected would by this time be greatly increased, has fallen below 30,000 a-day. The coming of the Emperor of Austria will, doubtless, have a good effect, but his Majesty will not arrive here till the 24th or 25th instant. Arrangements are being made for a grand closing ceremonial, at which the remaining prizes, those in agriculture and horticulture, will be announced, and possibly distributed, with others not yet delivered. The presence of the Emperor and Empress of Austria will give *éclat* to this closing *fête*.

M. Matthieu, member of the Institut, who was charged with the duty of drawing up a report on the weights and measures of various countries, is said to have completed his work, and delivered it to the committee specially appointed to take the subject into consideration; it is added also that the committee has drafted a plan for a general system of weights and measures.

The Minister of Commerce has recommended the Emperor to permit sale by auction, or otherwise, of goods or other objects in the Exhibition, and a decree to that effect has just been promulgated. The proprietors of the International Club in the Exhibition grounds are thereby authorised to establish a room for sales by auction, or otherwise, provided such sale shall not interfere with the regulations of the Exhibition. Before proceeding to carry out the measure thus permitted by the decree, proprietors of the club are bound to deposit 60,000 francs (£2,400) in the hands of the directors of the Caisse des Dépôts et Consignations.

MUSEUM OF THE ARCHIVES OF FRANCE.

This new museum, the opening of which was announced in the *Journal* a few weeks since, presents a highly interesting collection of documents and objects illustrative of the history of France. The museum occupies six rooms in the Hôtel des Archives, formerly the residence of the Prince de Soubise, in the Rue de Paradis, not far from the Place de la Bastille; the court-yard, the grand staircase, and other parts of the hôtel are remarkable in an architectural point of view. The museum is on the first floor, and the first *salle*, which is the largest of the six, contains a large number of rare charters, diplomas, and other documents of the Merovingian and Carlovingian periods, written on papyrus or parchment; charters of the fourteenth century; and registers, cartularies and illuminated manuscripts of the thirteenth, fourteenth, and fifteenth centuries. Amongst the documents on papyrus of the seventh and eighth centuries are several Acts relating to the Abbey of Saint Denis, by Clotaire II. (625), Dagobert I., Clovis II., Clotaire III., and Charles the Bald; and a letter addressed by Maginarius, Abbot of Saint Denis, to Charlemagne. In cases, in the centre of the room, is a fine collection of miniatures and illuminations on vellum, including some very remarkable specimens; one of these is a manuscript, entitled "Universal and Genealogical History," illustrated, commencing with the history of Adam and Eve in Paradise; it is written on twelve sheets of parchment, in the form of a roll, twelve yards long and more than twenty inches wide; there is no date, but the manuscript is in the style of the fourteenth century.

In the same apartment is a series of wax tablets, fourteen in number, on which the accounts of the Hôtel of Saint Louis were kept by Jean Sarragin, during the years 1256 and 1257; the writing was executed with a stylus. Most of these curious tablets are in excellent preservation. In the second room are charters and diplomas, being the signatures of monarchs and others of the sixteenth century; there is also a note in cypher by Jeanne d'Albert, Queen of Navarre, and mother of Henri IV. The third apartment was formerly the bedroom of the Prince de Soubise, is decorated with old carved wood work, tapestry, and some paintings by Boucher, and contains seals and manuscripts of the time of the revolution; several of these, executed by the unfortunate Louis XVI. while a prisoner in the Temple, bear the signature Louis Charles Capet. The next *salle* was formerly the boudoir of the Princess de Rohan, and in the centre is a glass case containing documents of the time of Napoleon, letters of various members of the Imperial family, and the will of Napoleon, exhibiting the codicil written by his own hand at Saint Helena. The other two apartments contain documents of still later date than the preceding. It is curious that Paris should not previously have possessed any public collection of this kind, with the exception of some few historical documents to be seen at the Louvre and in the Imperial library, while Rouen and several other public libraries in the provinces are famous for their illuminated manuscripts.

It is not generally known that the establishment of the Archives of France is connected with a college called the Ecole Imperiales des Chartes, established in 1821 for the study of documents, dialects, and writings of the middle ages; the college grants the degree of *Archiviste Paléographe*, which is held in high estimation, and the keepers of local archives are elected from amongst the successful students of the college.

MINERAL RESOURCES OF NEWFOUNDLAND

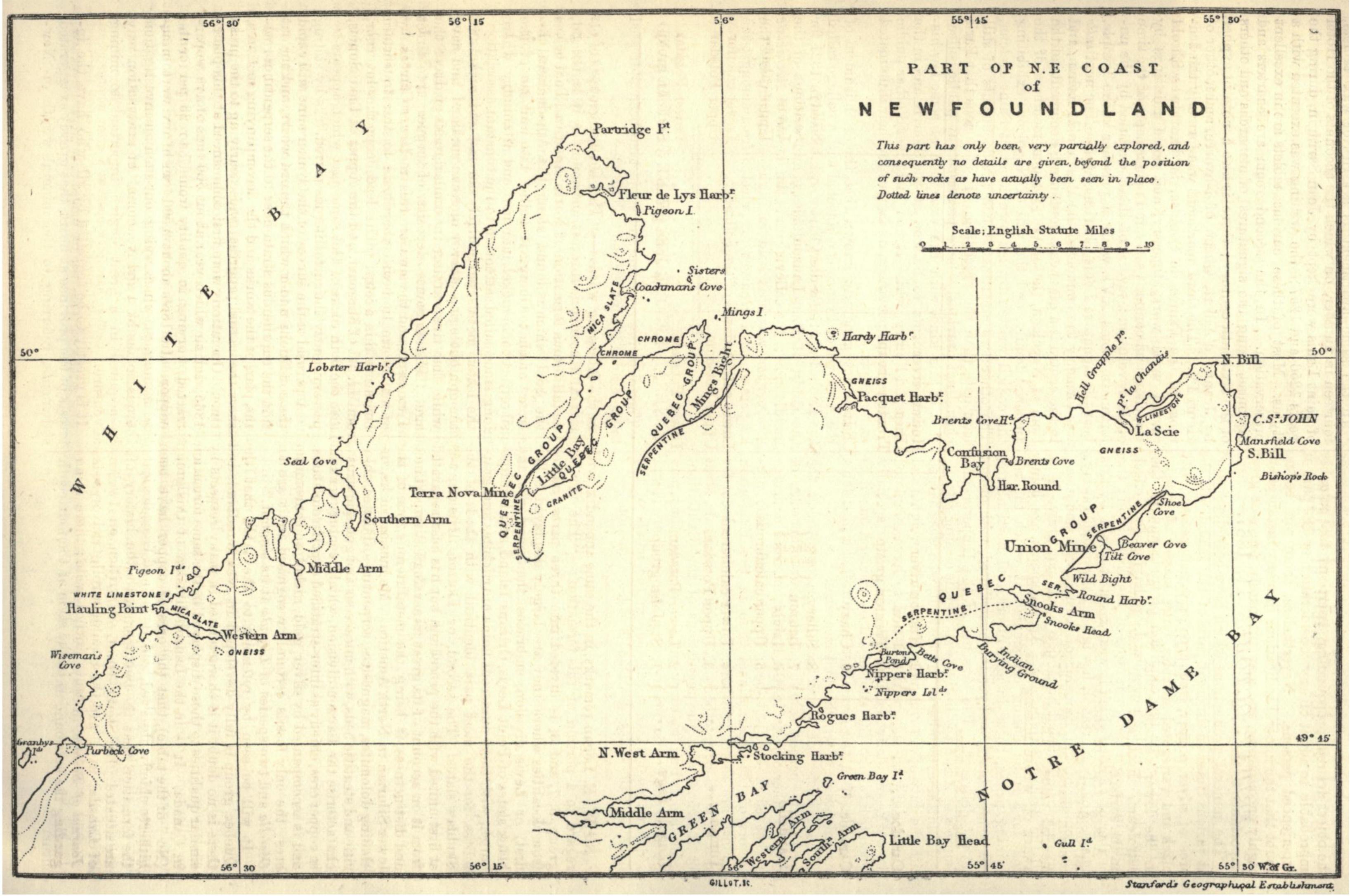
The following report on this subject has been addressed to the Crown Agent for the Colonies:—

Sir,—A copy of a correspondence between his Excellency A. Musgrave, Esq., Governor of Newfoundland, and the Crown Agent for the Colonies, in London, has been placed in my hands, relating to the mineral resources of that colony, it being the purpose of the authorities to bring certain portions of country where minerals are supposed to exist to public sale.

As I have been engaged for the last three years in making a geological survey of Newfoundland, and have during that time explored a considerable part of the island, the local government have been pleased to direct me to express my views on this matter, so far as my present information will permit, in answer to certain queries made in a letter to His Excellency the Governor, from Mr. W. C. Sargeaunt, Crown Agent for the Colonies, dated the 30th March, 1867.

It may be well to premise these remarks by stating that in a wild and unknown country there are many and serious difficulties to contend against while working out the structure and distribution of the geological formations, and ascertaining their several characteristics, mineral and fossil; and that while pursuing these duties it would be utterly impracticable for the geologist to devote such time, labour, and expense upon any one particular spot or even locality as would be required for the development of ores or minerals with a view to practical mining, yet in carrying out such an investigation there is no doubt a great amount of information may be acquired in a great degree important to mining adventure.

It is greatly to be regretted by all who have the interests of the province at heart, that grossly exaggerated statements, referring to the mineral wealth of New-



PART OF N.E COAST
of
NEWFOUNDLAND

This part has only been very partially explored, and consequently no details are given, beyond the position of such rocks as have actually been seen in place. Dotted lines denote uncertainty.

Scale; English Statute Miles

GILLOT. SC.

Stanford's Geographical Establishment

foundland, have at various times been circulated in a manner which has tended to retard rather than advance the object desired, propounding assertions too palpably improbable to admit of any consideration on the part of experienced persons. Nevertheless, there can be no doubt that the mineral indications in many instances are highly encouraging, and may ultimately prove of great importance to the colony.

The mineral productions which have been discovered at various times on different parts of the island are the ores of silver, copper, lead, iron, and manganese, with black and variegated marbles, large masses of gypsum in the lower carboniferous formation, plumbago and petroleum. Peat and shell marl abound at many parts on the surface.

A large tract of country is spread over by rocks of carboniferous age, but it is still doubtful whether they contain seams of coal sufficiently thick to be of commercial value. There are but three places, that I am aware of, where mining has been seriously attempted, viz., the "Terra Nova" mine, in Little Bay or Bay Vert; the "Union" mine at Tilt Cove, in Notre Dame Bay; and the "La Manche" mine at the head of Placentia Bay.* Copper ore in association with iron pyrites is produced at the two former of these locations, galena or sulphuret of lead from the latter, and as the work done at these places may to a certain extent afford an index to future similar operations, I shall endeavour to give my views respecting the geological horizon to which they belong, and the mode of their occurrence.

The accompanying map will show to a limited extent the distribution of that part of the lower Silurian system in which the Terra Nova and Union mines are situated; and the plan of the former, surveyed by myself, will illustrate the actual condition of the place up to the commencement of the present year; while, in order to make the matter of distribution as intelligible as possible, the following tabular arrangement of the formation is quoted from an Appendix to my Report for the year 1864-65, by Sir W. E. Logan:—

English Synonyms.	Complete Series.	Western Basin.	Eastern Basin.	Newfoundland.
Caradoc	12. Hudson river	Hudson river ..	.. ..	..
	11. Utica	Utica	.. ..	..
	10. Trenton group ..	Trenton group	.. ..	..
Caradoc (?)	9. Chazy	Chazy	.. ..	..
Llandeilo	8. Sillery Quebec group ..	.. ..	Sillery	Sillery.
	7. Lauzon ..	.. ..	Lauzon	Lauzon.
	6. Lévis ..	.. ..	Lévis	Lévis.
	5. Upper calciferous ..	.. ..	.. ..	Upper calciferous.
Tumadoc..	4. Lower calciferous ..	Lower calciferous	.. ..	Lower calciferous.
	3. Upper Potsdam ..	Upper Potsdam	.. ..	Upper Potsdam.
Lingula flags.. ..	2. Lower Potsdam ..	Lower Potsdam(?)	.. ..	Lower Potsdam.
	1. St. John group ..	.. ..	St. John group	St. John group.

Sir W. E. Logan remarks, in the same appendix, with regard to a portion of this formation:—"The Quebec group, 6, 7, and 8, is divided into three parts, named from localities where they are largely displayed. The first, or Lévis division, embraces the limestones and black slates of Point Lévis, Orleans Island, and Phillipsburgh, with their numerous fauna of trilobites and graptolites, for the most part identical with those of the Skiddaw slates. The second, or Lauzon division, was at first united with the preceding, but has been separated from it on account of its great mineralogical importance and distinctness, it being the metalliferous zone of the lower Silurian in North America. Magnesian rocks, including dolomites, magnesites, serpentines, diorites, chloritic and steatitic beds, with micaceous and gneissic strata, characterise the Lauzon division, which is moreover rich in copper ores, chiefly as inter-stratified cupriferous slates, and is accompanied by silver, gold, nickel, and chromium ores; the only fossils certainly recognised in it are an *Obolella* and two species of *Lingula* at its summit."

It will be seen by reference to the table that the Quebec group is fully developed in Newfoundland, and there is no doubt it is characterised in many respects by similar qualities to those displayed in the same formation in Canada. It is in the Lauzon division of this group (No 7 of the table), that the ores of copper have been hitherto chiefly observed, and it is in the same part of the formation that the two openings before referred to are situated. Dr. Sterry-Hunt, of the Geological Survey of Canada, in a pamphlet published in the *American Journal of Science*, in May, 1861, expresses his views regarding the economic importance of the Quebec group in the following words:—"This Quebec group is of considerable economic interest, inasmuch as it is the great metalliferous formation of North America. To it belongs the gold which is found along the Appalachian chain from Canada to Georgia, together with lead, zinc, copper, silver, cobalt, nickel, chrome, and titanium. I have long since called attention to the constant association of the latter metals, particularly chrome and nickel, with the ophiolites and other magnesian rocks of this series, while they are wanting in similar rocks of Laurentian age. The immense deposits of copper ore in East Tennessee, and the similar ores in Lower Canada, both of which are in beds subordinate to the stratification, belong to this group. The lead, copper, zinc, cobalt, and nickel of Missouri, and the copper of Lake Superior, also occur in rocks of the same age, which appears to be pre-eminently the metalliferous period."

A perusal of the survey of the Union mine will explain the conditions under which the ore occurs, and the relation the cupriferous strata bear to the serpentines; while the plan of the works and the accompanying section will show the actual progress made nearly up to the present time. Operations were first commenced at this place in 1865, during which year about 500 tons of ore were extracted, varying in quality from 7 to 23 per cent. of copper. In 1866 about 2,500 tons of ore were brought to the surface, which was divided and classed according to quality, as No. 1 and No. 2 ores. An analysis by Bath, of

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* Small openings have been made at a great number of places where metalliferous indications presented themselves, but the work done at those parts has been too limited to be properly designated as mining.

Swansea, of some good average specimens of this ore, is said to have yielded from 17⅝ to to 21¼ of copper. About 120 men of all classes have been recently employed at these works.

An extract from a narrative of my own proceedings during the year 1865, addressed to His Excellency Governor Musgrave, expresses my views as to the probable mode in which these ores will be found to occur in this formation generally, and at this place in particular:—"While in the neighbourhood of Tilt Cove I took the opportunity of crossing over the peninsula from Shoe Cove to La Icie, in order to get a stratigraphical section of it as well as my time would permit. Without entering into particulars as to the lithological character or stratigraphical arrangement, I may broadly state that the ore deposits of Tilt Cove occur under conditions strikingly similar to those known in Eastern Canada, and to characterise rocks of contemporaneous origin. By reference to the plan, it may be observed that the metallic material is arranged in isolated, irregularly-shaped masses, through a set of strata conforming with beds above and below, of a calcareo-magnesian quality, and that these beds are succeeded on the north by a great body of serpentine. As, from all I have hitherto seen, and from all the information I have been able to gather, the copper will in this country most frequently be found to occur in a similar manner, that is to say, in beds, rather than in regular veins or lodes, I think it right to call particular attention to the facts of this case, and to express a strong opinion, for the benefit of adventurers or explorers, that the immediate neighbourhood of the serpentine rocks, wherever they may be found to exist, will be the most probable position for their labours to be crowned with success. These serpentines, besides being associated with many valuable metallic substances, frequently afford a beautiful variety of marble, which in many cases might of itself prove of considerable importance, added to which may be enumerated the frequent occurrence of other reverberatory minerals, such as soapstone, potstone, asbestos, and talc. Chromic iron is frequently associated with the serpentine, and may probably be discovered in some parts in workable quantity."

The experiment of the Union Mine has, so far as it has yet gone, proved eminently successful, and as the indications on the east side of Winsor pond exactly correspond with those on the west side, where the work is proceeding, it is but reasonable to infer that a vast amount of ore may be extracted from the same deposits beneath the pond, and further on in the strike on either side.

At the Terra Nova location the experiment of mining has not hitherto proved remunerative, but its position in relation to the serpentine may be regarded as favourable and worthy of more extended trial. The metalliferous stratum upon which the principal shaft has been sunk, and upon which the drifts are driven, appears chiefly to consist of an enormous mass of iron pyrites, with an occasional admixture of yellow sulphuret of copper. Native copper has been observed occasionally in small quantities among the serpentine. Reference to the plan will show that the mining done up to the end of last year is confined to a small space, and that the ground is by no means thoroughly proved, although a very large amount of labour and expense has been bestowed upon the surface.

From what has been stated above, therefore, it will be evident that the distribution of the serpentine is a matter of high importance to those interested in the discovery of metalliferous ores, and, as the formation of which it forms a part is largely developed in various parts of the island, there is good reason to anticipate that Newfoundland will become, in course of time, a great field for mining industry. The serpentine is largely developed on the north side of Hare Bay, and between that bay and Pistolet Bay; it occurs also in great extent on the west side of the island, at York Harbour in the Bay of Islands, and from the southern arm of that bay to Bonne Bay.

From the evidence procured from Topsail Head, in Conception Bay, there appears to be a great series of strata of more ancient date than the lowest Silurian and newer than the Laurentian, consisting of slates, with interstratified bands of quartzite, diorite, and jaspery beds, the latter often of a red colour, with a mass of red or grey altered sandstone and conglomerate at the summit. These rocks are intersected by numerous veins, most frequently of quartz, but in many cases of calc-spar, or a mixture of the two, which occasionally contain the ores of lead, sometimes associated with silver and copper. The rocks of the La Manche locality will probably prove to belong to this series, but the formation has as yet only partially been followed out. As regards the mine, circumstances at the time of my visit to the latter place unfortunately prevented me from making a thorough examination of the ground, and such information as I was able to obtain is given in a preliminary report of mine, addressed to his excellency on the 1st March last:—

"The La Manche mine is situated near the north-eastern extremity of Placentia Bay, between Little Southern Harbour and Little Bay. The vein that is worked for lead varies in width from three to six feet, and is chiefly of calc spar, much of which is tinged of a pale pinkish amethystine colour. Sulphate of barytes, quartz, and fluor spar, are more or less distributed through the vein, the walls of which are frequently lined with beautiful crystals of amethystine quartz, and occasionally with blue or green malachite.

"The ore is distributed irregularly through the whole thickness of the vein, sometimes in pockets or lining drusy cavities or cracks, called vughs by the miners; but there appears to be also a pretty regular and continous string of ore near the middle of the lode, of from one to four inches in thickness, from which the prill ore, as it is termed, is chiefly derived. The run of the vein is about north 63° east (true bearing) from the water's edge, and its altitude vertical, maintaining that course and altitude with great regularity, and being traceable on the surface for a considerable distance. The lode cuts a set of green, very hard and brittle, compact cherty or jaspery slates, which cleave exactly with the bedding, and for the most part weather an opaque white, which discolouration extends into the stone for an inch or more. The dip on the south-eastern side of the lode is about north 27°, west 25°; that on the north side points in the same direction, but with an increased rate of inclination. From the position of the vein to the entrance of Little Southern Harbour, the measures gradually accumulate upon this dip, but as there are several dislocations observed in the cliff, it is probable the same stratum may be repeated. A considerable amount of red strata are visible in the cliffs, of a hard jaspery character, alternating with a rock of a dark bottle-green colour, having the aspect of diorite, but, being incapable of landing to examine that part of the coast, I am unable to state the mineral characters with certainty."

Indications of lead ore are of frequent occurrence at many parts where rocks supposed to be of the same horizon display themselves, as in the cliffs of Topsail Head, at Cape Chapeau Rouge, at Lawn, where some beautiful samples of silver ore were likewise discovered, and in the harbour of St. John's itself, facts tending to induce the belief that mineral treasures may reasonably be expected, in course of time, to be brought to light. Veins containg lead, however, are apparently not confined to any particular formation; the presence of that metal has been observed as low as the Laurentian, and as high as the coal measures; but whether the veins holding the ore are of one or different ages, has not been ascertained. One vein, which appears to be more recent than the lower carboniferous, and is mentioned in the narrative of my expedition in 1865, appears to be worthy of trial. The following is quoted from the narrative alluded to:—

"It has been already stated that sandstones of the coal formation come against a limestone of lower Silurian age, at a point between Romain's Brook and the Isthmus of Port-a-Port, in the Bay of St. George. This limestone strikes along the shore, in the direction of Cape St. George, and may probably reach that point, although, being unable to follow the coast, I cannot state that it does so with certainty. Inside the Bay of Port-a-Port, beds of calciferous limestone run along the shore, dipping at a moderate angle to the north, but at the head of the coves or indentations of the coast, these rocks are brought abruptly against another set of calcareous strata by a fault, the fossils of which are of the lower carboniferous age. Running in the line of dislocation, which at one part bears north 65° east, south 65° west, but which has generally, perhaps, a more nearly east and west course, galena, or the sulphuret of lead, reticulates in strings associated with large rhomboidal crystals of calc spar. The fault shows itself at intervals with its associated minerals, at the heads of several of the deeper coves at this part of the coast, and, as I was informed by a very intelligent resident, is again to be recognised to the westward, at a place called Piccadilly. The condition in which this galena occurs, is such as to warrant diligent investigation and trial on the part of mineral explorers, as there is great probability that in some parts of its course this lode may be found to produce a remunerative supply of ore."

Respecting the presence of the precious metals in the island, little is at present known. Some beautiful small specimens of a pure sulph-arseniuret of silver, usually called ruby silver, yielding, on analysis, 65·28 per cent. of the metal, and encrusted with chloride of silver, known as horn silver, were discovered some years ago, at a place called Lawn, on the south shore, not far from Cape Chapeau Rouge; and small specs of gold have been exhibited, which were said to have been derived from a vein of quartz, near Ming's Bight, on the north-east side of the island. During the past season, several samples of quartz veins were procured by myself, where no probability of the precious metals was suspected, and some were forwarded to Montreal for analysis, the result of which is given below, with each locality.

Supposed Laurentian.

Quartz, with iron pyrites visible, from Deer Lake, Humber River	Silver, 0·0205 per cent. Gold, none.
Quartz veins on the island, Deer Lake, ditto	Silver, 0·0060 „ Gold, none.
Quartz veins from the south shore of Deer Lake	Silver, 0·02633 „ Gold, none.

Lower Silurian.

Quartz and calc spar veins from Brake's Landing, at the entrance to the Humber River	Silver, 0·01033 „ Gold, minute traces.
Quartz veins from Meadow Point, Humber Arm, Bay of Islands	Silver, 0·00666 „ Gold, traces.
Quartz veins from calcareous slate, from Cooke's Cove, Humber Arm, Bay of Islands	Silver, 0·00833 „ Gold, traces.

(Signed) E. J. Blackwell,
For G. P. Girdwood, Assist.-Chemist, Montreal.

It will be seen that the presence of silver is indicated, to a small extent, in all these samples, while a trace of gold is detectable in each of the veins cutting lower Silurian strata; none whatever in those intersecting the Laurentian.

Gypsum is largely developed on the western side of the island, among the lower members of the carboniferous system; there is a vast exposure of that mineral on the coast between Codroy Island and the Codroy River, where it might be quarried to any extent, while there is a moderately good harbour for small vessels in Codroy Island. The same mineral occurs at various parts of the coast in St. George's Bay, on both the north and south sides, but those parts are usually rather unfavourable for vessels lying safely at anchor, although frequent opportunities may be had during the summer months for taking in cargo. At Romain's Brook, on the north side of the bay, there is a large exposure of gypsum, much of which is very pure white, and will probably be found to be well adapted for stucco purposes.

Besides the metallic ores and the more valuable substances, the island abounds in material of great economic importance. Marbles of almost every shade of colour have been produced from various parts of the coast, on both the eastern and western shores. Roofing slates of excellent quality are already known and partially worked in Trinity Bay. Plumbago occurs in the Bay of Despair. Indications of petroleum have been observed at a few localities, while building stone, whetstones, grindstones, and limestone are in ample profusion.

Notwithstanding the usually very forbidding aspect of the coast, there is clearly a large proportion of the country perfectly capable of being reclaimed, and converted into fairly productive grazing or arable land. The most favoured tracts that have yet come under my own observation are in the coal measure districts, where the surface is often flat or gently undulating over great areas. In my report of last year, 1866-67, I have shown, by a rough calculation, that there are probably about 726 square miles, or 446,080 square acres, more or less available for settlement on the carboniferous country of the western part of the island alone, which embraces the following districts:—

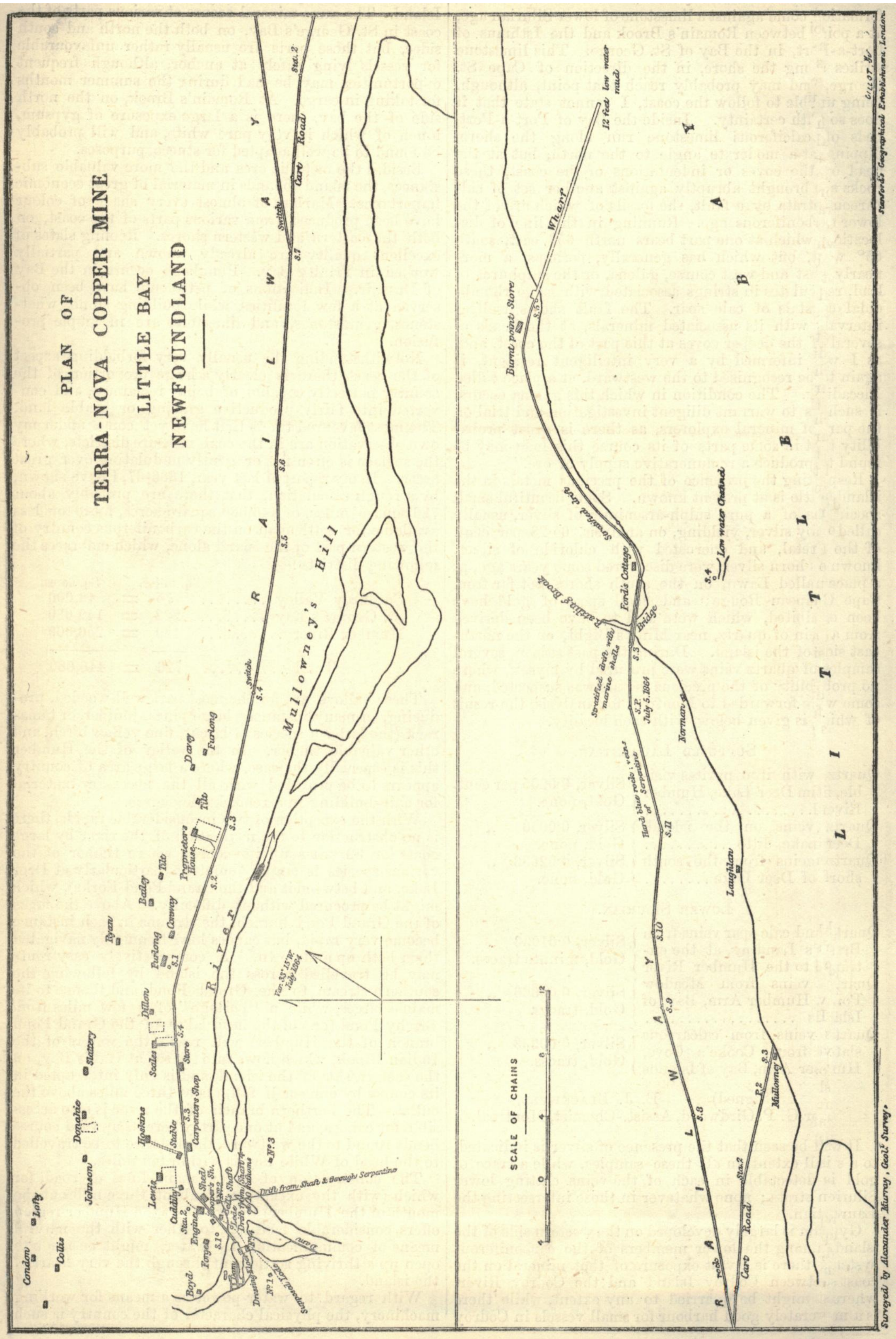
	Sq. miles.		Sq. acres.
Corduroy Valley	75	=	48,000
St. George's Bay	222	=	142,080
Humber River	429	=	256,000
Total	726	=	446,080

These valleys are for the most part well wooded, producing, in many instances, large pines, juniper, or tamarack (the latter a species of larch), fine yellow birch, and other valuable timber. In the valley of the Humber this is especially the case, where a large area of country appears to be provided with all the necessary material for ship-building in a remarkable degree.

With the exception of two inconsiderable rapids, there is no obstruction to the navigation of the river by large boats for 32 miles up its course, where timber of the various species is amply abundant (particularly at Deer Lake, and between it and the Grand Pond Forks), which might be procured without difficulty. Above the forks of the Grand Pond branch, the streams in each instance become very rapid, but canoes have frequently navigated them both up and down. A comparatively easy route may be travelled across the island by following the southern stream to the Grand Pond, and thence to its main sources, while a "portage" of a few miles from Birchy Pond (one of the head lakes of the Grand Pond branch of the Humber) will reach the waters of the Indian Brook, which flows into the sea at Hall's Bay, on the eastern side of the island, and is only interrupted in its course by one small fall, about three miles above the outlet. The northern branch of the river is also accessible for canoes, and at one part, where its upward course bends round to the westward, the distance to be travelled to the head of White Bay is within ten miles.

The construction of a few main lines of road, for which (with the exception of about three miles at the mouth of the Humber) the whole of the Humber region offers considerable facilities, together with the natural means of communication by water, might be made to open up a thriving settlement through the very heart of the island.

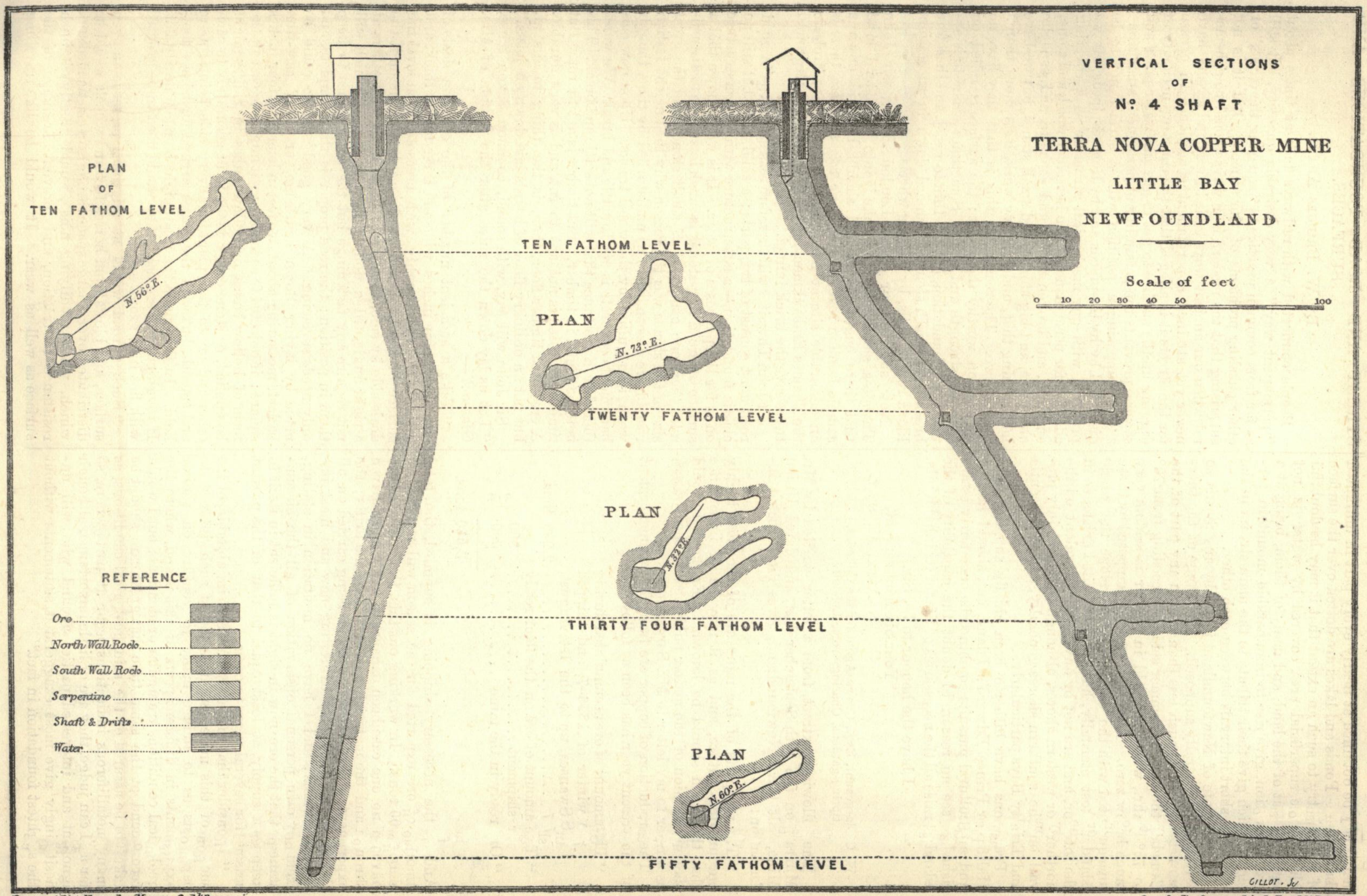
With regard to water-power as a means for working machinery, the physical character of the country is such



PLAN OF
TERRA-NOVA COPPER MINE
LITTLE BAY
NEWFOUNDLAND

Surveyed by Alexander Murray, Geol. Survey.

Stanford's Geographical Establishment, London.


VERTICAL SECTIONS OF Nº 4 SHAFT

TERRA NOVA COPPER MINE

LITTLE BAY

NEWFOUNDLAND

Surveyed by Alexander Murray Geol. Survey

Stanford's Geographical Establishment

that it can be obtained at nearly every part in unlimited abundance. Ponds and lakes are dotted over the surface of the country to such an extent that it may be doubtful whether the superficial area covered by water is not equal to that of the land, and many of them, being at a great elevation, give rise to innumerable mountain torrents, which give their tribute to the main stream in the valleys at short intervals between each other.

The climate of Newfoundland is not by any means so severe as is generally supposed. The range of the thermometer is very much less than it is in any part of the Canadas, the heat in summer seldom exceeding from 70° to 75° Fahr., while the cold in winter is seldom very much below zero. The fogs, generally supposed by those unacquainted with the country to envelope the whole island almost eternally, have but a limited existence in the interior, and are not by any means prevalent on the northern or western shores, although they certainly prevail on the southern shores generally, and at Placentia and Trinity Bays particularly.

Provisions have hitherto been chiefly supplied from Halifax or Prince Edward's Island, but, should mining and agricultural pursuits combined be once fairly established, I see no reason to doubt the capability of the island to raise all the necessaries of life for its inhabitants.

I have the honour to be, Sir,
Your obedient servant,
Alex. Murray.

W. C. Sargeaunt, Esq., Crown Agent for the Colonies,
Spring-gardens, Charing-cross, London.

The following extract, from a letter written by Mr. Murray, on the 10th September last, and dated Union Mine, Salt Cove, Newfoundland, gives more recent information:—

"The prospects of the mine are of the most highly encouraging nature, and as it may be of importance that the truth should be known in England, I should like my opinion of the matter published in the *Journal*, as a rider to my letter to Mr. Sargeaunt.

The production of copper ore from the commencement of the present year has been as follows:—

"The amount of ore accumulated during the winter of 1866-7, and shipped for Swansea, up to the 1st August, 1867	2,200 tons.
"The amount of ore on the floor ready for shipment	880 "
"Ore ready in the mine	500 "
	3,580 tons.

And if the necessary shipping is supplied, the total amount of ore exported for the season will not be less than 4,000 tons. In working out this, the masses of ore have in no one case been exhausted, but simply driven through and the material extracted from the drifts; the experiment of proving the ground being carried on all the time, and constantly exhibiting new and most important masses; and I have no hesitation in stating, from my own personal observation of all the circumstances, that the ore now in sight is sufficient in itself to keep up a supply, at least equal to that of the present season, for several years to come.

"I consider that the facts, which are indubitable, of the success of this mine ought to be of such interest to capitalists as to induce many to venture on similar experiments in different parts of this island, where the geological conditions are similar or identical; but I would recommend at the same time that great care should be taken to be assured of the said geological conditions, as many metalliferous indications occur at parts where, so far as I can judge, they are of little importance, although ignorant and interested parties abound who will unhesitatingly give most exaggerated statements without the slightest foundation in fact."

STREET AND ROAD FOUNDATIONS AND SURFACES.

By W. Bridges Adams.

People connected with railways talk at times about "permanent way," a very desirable quantity, but still as far from common practice as "squaring the circle," or other puzzling problems of the schools. But it is not surprising that the modern iron ways should be ephemeral when our ancient ways called roads and streets have never yet attained a permanent condition. In excuse for the streets it is alleged that the constant necessity of digging up the surface to get to gas and water pipes and sewers, prevents the possibility of permanent structure.

But supposing a position with a surface not to be disturbed by hydro-pipeds and hydrogeni-pipeds, are we prepared with any mechanical structure as a covering adapted for permanence? We have had wood, and stone, and iron, and broken stones, and asphalte, and asphalte and stone, and big stones, and small stones, but we have had nothing that, under heavy work, lasts more than a year or two. The reason for this is that they have no foundation worthy the name; the surface is relied on both for strength and wear. Sometimes concrete is applied as a foundation, but too thin to resist, and therefore breaking, as each stone is rammed down in succession, like a row of nails, by passing wheels.

Now suppose our great London Ædile, Sir John Thwaites, should, for once, take it into his official head that there ought to be, and should be, laid down a sample London road, and say, *sic volo sic jubeo*, there is an admirable site at hand, and under his control, in the Thames Embankment, as yet guiltless of underground tubes save the brick tunnel.

Sir John Thwaites will therefore reason thus:—"A good road must consist of two parts; a solid, firm, but still an elastic foundation,—a substructure with a superstructure on it for the purposes of wear. It is well known that a surface of broad flag-stones is much less liable to disturbance than one composed of small stones, and the great size of the stones was the reason why the ancient Italian roads have descended to us undisturbed by time, though worn into gullies by the wheel tracks. Upon new embankments concrete is apt to settle and break. We want, therefore, a substance that will not settle and break. This is to be found in timber. But timber is apt to rot. But timber creosoted is not apt to rot, and is very durable. A creosoted timber floor, then, is the [thing to aim at, but not an ordinary floor of boards laid down on joists."

Sir John will say, with sound, common Saxon sense, "Let us lay down the rules after the fashion of Mrs. Glasse:"—

"Take a sufficient number of the common deals of commerce, nine inches wide and three inches thick, and saturate them thoroughly with creosote, then level the surface of the projected road and lay down on it the deals side by side, then cross these deals with others at a right angle, till a double floor is formed, which will not require any fastenings but the curb stones to keep them in position; the road proper is thus complete, and only needs surfacing. A very good surface could be made by laying down kentledge, or ships' cast-iron ballast, measuring about two feet in length by four inches square; if objected to as too heavy it might be cast in the form of hollow boxes, or hollow cubes in ridges might be applied, or stone cubes made to fit accurately to each other and on to the planking, every side being square and smooth, but with the edges arrised for horses' foothold. In this mode the road might be made nearly flat. If rough cubes were used, they would need to be grouted with hot lime grout.

"Such a road would at all times preserve an even surface, and blows from horses feet and wheels would be distributed over a large space through an elastic medium, which, while modifying noise, would greatly diminish resistance to traction, and prevent breakage of the surface as well as wear. It would be like travelling over a large sheet of ice. The road might be more costly at the outset than other roads, but it would be infinitely more durable, and upon the whole it would probably be cheaper than the sham structures now passing under the name of roads. It would, moreover, be most rapidly laid down and renewed, and be perfectly free from dust and nuisance, and very easily cleansed on the surface; and would be highly appreciated by the public using it. On the whole, therefore, it is decidedly a proper thing for the Board of Works to set so good an example."

We think the public will agree with Sir John, and that Baron Hausmann will pale his pretensions before the doings of our great London Ædile, who will thus

> "Achieve a name,
> Beyond all Greek, beyond all Roman fame."

And when Sir John has set this good example, perhaps Mr. Cowper will take heart-o'-grace, and, for the first time, give us really dry surfaces in front of Buckingham Palace and the Horse Guards, with Macadam, if he prefers it, on a creosoted timber floor.

Manufactures.

◆

Boiler Explosions.—Mr. L. E. Fletcher, chief-engineer of the Association for the Prevention of Steam-boiler Explosions, in a recent report states that, during the past month 272 visits of inspection have been made, and 624 boilers examined, 392 externally, six internally, eleven in the flues, and 215 entirely, while in addition four have been tested by hydraulic pressure. In these boilers 170 defects have been discovered, six of those being dangerous. He then gives a tabular statement of defects, omissions, &c., met with in the boilers examined, from which it appears that a high number of 'entire' examinations is still maintained, as many as 215 boilers, out of the 624 inspected during the past month, having been examined 'entirely,' that is to say, internally as well as in the flues. It is on these 'entire' examinations that the Association relies more especially for the prevention of explosions, and therefore attaches considerable importance to their increasingly high number. This is greatly due to the working of the guarantee system, which makes an annual 'entire' examination of every boiler an essential condition of granting the guarantee. The defects met with, however, during the month were of an ordinary character, and do not present any features of sufficient interest to merit detail reference. As regards explosions, he says:—"Explosions are not occuring with the same rapidity this year as in many previous ones; and on the present occasion, as in the preceding month, I have but one explosion to report, which occurred to a boiler not under the inspection of this Association. No. 16 explosion is an illustration of the danger of setting boilers on mid-feathers, especially when the boilers are of large diameter. This explosion, which resulted in the death of two persons, as well as in injury to two others, occurred at a woollen mill, at twenty minutes after eight o'clock on the morning of Thursday, July 11th, when the engine was at rest during the breakfast time. The boiler was one of a series of three set alongside of the mill, and parallel with it, all of them being internally fired and worked at a pressure of about 30lb. on the square inch. The exploded boiler, which was the inner one of the series, and set nearest to the mill, was of the Cornish class, having a diameter of nine feet, a length of twenty-six feet, and being made of plates 17-16th of an inch in thickness; while the internal tube, which ran through the boiler from one end to the other, measured five feet in diameter at the furnace end, and tapered down to four feet behind the fire-bridge. The boiler gave way in the external shell, the primary rent occurring at the bottom, where in contact with the mid-feather wall, on which it rested. This primary rent extended longitudinally for a length of about ten feet, when at each end of this line it assumed a circumferential direction running more than half way round the boiler, and in this way severing from the shell a tongue or partial belt, consisting of five widths of plate, and situated nearly midway between the two ends of the boiler. This tongue was opened out nearly flat, and the boiler thrown forward some fifty feet from its original position, passing on its way through a four-storied house, which it brought to the ground; while, in addition, a considerable portion of the mill, close to which the boilers had been set, was blown down, the adjoining boiler in the series thrown from its seat, the boiler-house laid in ruins, and the mill brought to a standstill. The cause of this explosion I found, on visiting the scene of the catastrophe and examining the fragments of the exploded boiler, to be apparent at a glance. The edges of the plates, at the primary line of fracture which had run along the mid-feather wall, were seriously reduced in thickness by external corrosion, being eaten away to the thickness of 1-16th of an inch, while in some places they were as thin as a sheet of paper, so that the wonder is, not that the boiler exploded when it did, but that it had not done so long before. A careful flue examination by a competent inspector would have shown the dangerous state of this boiler in time to have prevented the explosion. Evidence to this effect was given at the inquest; a scientific witness stating that 'the explosion was not attributable to deficiency of water, but solely to extensive corrosion of the plates on the under side, caused by leakage of the seams, and dampness of the brickwork, which was a well-known source of danger, and ought to have been guarded against.' The jury brought in a verdict of 'Accidental death,' adding, however, that the owner of the boiler, as well as the person who had charge of it, were censurable for the explosion, though not criminally responsible, while the foreman took the opportunity of recommending that every millowner should have his boilers periodically examined. On this occurrence of another fatal explosion to a boiler resting upon a mid-feather wall, the members of the Association may be once more appealed to to discontinue so dangerous a mode of setting, and to adopt side walls with suitable seating blocks instead. This latter plan is superior on many grounds. If the flues are damp the moisture rises more readily through the mid-feather than through the side walls, as there is, in most cases, less height of brickwork in the former for it to travel through. Also, any water that may either fall on to the boiler or leak from the seams, is more liable to lodge in contact with the plates on the top of the mid-feather than on the side walls, the bearing surface of the mid-feather being at the bottom of the boiler so that it collects all the drainage, and being horizontal so that it retains it, while that of the side walls is inclined, and thus affords the water an opportunity of escaping. It is not thought, however, that the corrosive tendency of moisture is the only cause of the injurious effect of mid-feathers, but that it is materially promoted by mechanical action. A boiler does not 'ride' so comfortably on a single longitudinal seating as when carried on two, and when the weight of a large boiler is thrown entirely on a mid-feather, a change of form frequently takes place with every change of pressure. This has been distinctly observed on the application of the hydraulic test, the internal pressure raising the boiler, while it might no doubt be seen in some cases on getting up steam. In making internal examinations of boilers set on mid-feathers, the plates at the bottom of the shell are not unfrequently seen to be flattened all the way along at the centre line, so that the mid-feather can be distinctly traced even inside the boiler. It will thus be seen that an alternate flattening movement is carried on throughout the line of the mid-feather wall on every variation of internal pressure, which tends not only to strain the ring seams of rivets and make them leak, but by its buckling action to 'fatigue' the metal, and thus very much to accelerate the ravages of corrosion from moisture upon the body of the plates, so that a mid-feather wall may be said to produce a description of longitudinal 'furrowing' along its bearing surface. This will show the importance of the recommendation constantly made to those members who have boilers set on mid-feather walls, that they should have the brickwork ploughed out at the transverse seams of rivets for purposes of inspection. Without this it is impossible to ascertain the condition of the plates, since, although they may appear perfectly sound on each side of the mid-feather wall, especially if it be a wide one, they may yet be dangerously wasted in a longitudinal 'furrow' all along the centre line. These openings need not be large; it will be sufficient if they are about nine inches long by three inches high, and cut completely across the wall, so that if a light be held on one side they can be seen through. They need not be permanently filled up after an inspection, but merely stopped temporarily with a little fire clay, so as to be easily re-opened whenever re-examination is necessary. In conclusion, it is earnestly recommended that no boilers, having a diameter of five feet and upwards, should be set on mid-feather walls, but if in the case of small boilers, and under exceptional circumstances any of these walls should still be adopted, then the boilers should rest on suitable seating blocks, instead of on bricks; while the bearing surface should not exceed an inch in width for every foot in the diameter of the boiler, and sight-holes, as explained above, should be ploughed out at each of the ring seams of rivets." He then gives the following account of a fatal explosion of a hot-water bottle:—"This explosion took place on the 31st March, and though it cannot rank either among those of steam-boilers or household ones, yet, as it resulted in the death of one person, as well as in serious injury to two others, it is of importance socially; while, independently of its effects, it is of interest in a scientific point of view, and, therefore, the particulars of this explosion may be given, though it occurred only to a hot-water bottle. The bottle in question was of earthenware, of about a quart capacity, and used when full of hot water as a bed-warmer. It had been put to this service on a previous occasion, when the cork had been tied in with a wax end, such as is commonly used in shoemaking. When the bottle was wanted again for a similar purpose, instead of being emptied of its cold water and refilled with hot, it was put, all tightly corked, into the oven of a kitchen range, to be heated up entire. In a short time a violent explosion ensued, the bottle was burst in pieces, a corner of the oven door split off, and the fragments of iron and earthenware thrown into the room with so much force that three persons were seriously injured, one of them, a child, dying the day after. This explosion, though calculated from its simplicity to provoke a smile, is, in an engineering point of view, of considerable interest, and involves important principles. The explosion of household boilers is always attributed to the water supply being allowed to run short, and then suddenly re-admitted on to red-hot plates, which is supposed to be productive of a wonderfully disruptive force; while, with regard to explosions generally, it is too frequently thought that a gradual accumulation of steam is insufficient to produce the disastrous results attendant on them, which are therefore attributed to some sudden generation of pressure from the detonation of gases or other imaginary cause; while others again hold the opinion that no boiler can explode if suitably supplied with water, and that though it might rend, it would do so without violence. There is no getting away, however, from the facts of this explosion; its simplicity renders it most convincing. There was no pipe to suddenly re-admit the feed, as in the case of the household boiler, on to the supposed hot plates, while the circumstances forbid the explosion being attributed to any other cause than quiet internal pressure from the gradual accumulation of steam, which, it will be seen, did not quietly rend the bottle, but violently exploded it. This little incident supports the views expressed in the Association's report for January, 1867, relative to the explosions of household boilers, viz., that they were due simply to the gradual accumulation of steam, and might be prevented by an efficient safety-valve."

Commerce.

Supply of Cotton.—Messrs. George Fraser, Son, and Co., of Manchester, in their *Circular* for October 1st, say:—"With regard to cotton, although the stock will now begin rapidly to diminish for some months to come, all fears and anxiety as to the future supply may be considered to have passed, for—with a stock of 820,000 bales in Liverpool at the end of last week, and 330,000 bales on the water, and with the most reassuring accounts from all the principal cotton-growing districts of the world, with such local exceptions only as the plant is always liable to, however good the season—there does not seem to be any likelihood of scarcity; and as there is yet ample margin for a further fall before old normal values are touched, we shall probably see a gradual decline in prices until they become so low again as to be unremunerative to the planter, and thus lead to a curtailment in the extent of land put under cultivation."

Means of Transport in Italy.—The necessity for increasing and facilitating the means of communication has often been urged by us (*Giornale delle Arte e delle Industrie* of Florence) as the only way to develop the industries and commerce of this country. It appears, unfortunately, that these resources have been left to take care of themselves, and those whose interest it would seem to be to promote such undertakings seem to be opposed to any scheme of improvement. It will only be necessary to mention the following well-known trades and industries in order to form an idea of the great importance of a cheaper and more rapid means of communication to the future prosperity of the country. In the first place there is mineral fuel in Cadibona, Nocelto Orta, and the centre of Tuscany; it is well known that lignite, at present produced on a small scale, with an easy means of transport from the pits' mouth to the principal lines of railway, would increase to an enormous extent. In Sardinia these railways are not even made between the principal towns; the traction engine has an important mission to fulfil. Road locomotives will play even a more important part in Sicily, where many sulphur mines have been suspended on account of the serious expense attendant on the transport from the mines to the nearest seaport; and the same may be said for the various other products of this island, more especially wines, from which it might derive immense benefits. The same will be required for the Neapolitan provinces, and it is no secret that even in the Tuscan provinces the transport of goods is a most difficult problem. Road locomotives are required at Volterra for the transport of alabaster; at Serravezza and Stazzema for marbles; at Massa for the carriage of marbles, silver, and copper; at Spezia for the development of the immense mineral wealth that exists in the chain of mountains that surround it, stretching from the Apennines on the one hand to the plains of Parma on the other. Savona also for the glass works and various manufactures in the neighbourhood. The town of Chieri, rich in agricultural produce, requires to be put in communication with the Piedmontese railways. The northern part of the province of Novara, and, finally, a number of small towns and villages in Lombardy and the Venetian provinces, are in the same position. In conclusion, everything tends to show that a system of steam communication on the common roads cannot fail to be attended with most beneficial results.

New Telegraph to India.—A telegraphic conference has been held at Berne, which is said to have resulted in the signature of a draft treaty between France, Switzerland, Austria, and Turkey, with a view to the establishment of a line communicating with India without touching the soil of Prussia or Russia. Switzerland undertakes to lay down a special line for dispatches passing between Paris and Constantinople, which are to be entirely free from all control by the Swiss authorities, who will, however, receive a fee of one franc for each ordinary dispatch.

Colonies.

Trade of Victoria.—The imports for the first five months of the year have fallen short of those for the same period of last year by £691,968, and last year was a bad one. In the same period the exports have increased by £231,855. If the latter sum had represented articles of manufacture it might have been matter for congratulation, but unfortunately it represents only gold, of which the export of the produce of this colony exceeded that of 1866 by £337,012. The balance of imports over exports in the first five months of 1866 was in favour of the colony to the extent of £804,041, but during the same period of the present year it was only £129,722. The *Melbourne Argus* says:—"The colony unquestionably owes therefore to the operation of the tariff a loss of nearly £700,000 in the trade of the first five months of the year, without placing any value on the natural increase of business which ought to have accrued from the ordinary progress of a young country full of resources. But even these figures do not show the full extent of the loss which the country is sustaining through the operation of the tariff. In the first five months of 1866 we received from New Zealand 133,884 ozs. of gold, worth say £535,536, whilst in the same period of this year we imported only 81,836 ozs., worth about £327,344. That gold may be taken as representing the comparative value of our trade with New Zealand in these two periods. The gold-fields of the west coast of New Zealand are certainly not less productive than they were a year ago. The contrary, indeed, is the case. They are more numerous, more populous, more productive, and yet our trade with them has not only not increased, but has absolutely fallen off by over £200,000. None of the other countries have contributed materially, if at all, to make up this deficiency."

Exploration of North Australia.—The Government of South Australia has resolved upon making another expedition to the northern territory, under the command of Captain Cadell. Burke Town is to be the rendezvous, and in about three months the captain is to be at that seaport, when he will inform the South Australian Government of his ulterior intentions. Should all be in order on his arrival there, he will set sail, and proceed with the exploration of the whole of the Adam Bay country, besides Port Darwin, Anson Bay, Port Keats, and the Victoria River. It is probable that this expedition will be of great value, as Captain Cadell is provided with an ample number of horses, provisions, and men, and his vessels are also good ones.

Publications Issued.

The Civil Service Geography. (*Lockwood and Co.*) This is a manual of geography, general and political, arranged especially for examination candidates and the higher forms of schools. It is the work of the late Lancelot M. Dalrymple Spence (of H. M. Civil Service), and has been revised throughout by Thomas Gray, one of the Assistant-Secretaries to the Board of Trade. In the introduction, the author says that he has endeavoured to supply a want once experienced by himself, and, he believes, still felt by many about to undergo a Civil Service or other examination, where geography is one of the proposed subjects. The two great objects to be kept in view by the student are, to get mapped out in his mind the relative situations of places, and to acquire a knowledge of the general, political, and physical characteristics of each country. On this plan the present work is framed. To assist the student in attaining the first object, tabular lists, geographically arranged, of the principal divisions, towns, seas, gulfs, rivers, mountain ranges, &c., are prefixed to the accounts of the various countries, &c., comprised in the great divisions of the globe; and to aid him in acquiring a knowledge of the general, political, and physical characteristics of each country, a detailed description of all the most important countries in the world is given, their colonies and dependencies, with their mountains, rivers, lakes, and islands; their mode of government; their manufactures, exports and imports, population, army and navy, and many other particulars, are also described. The student is particularly recommended in this work to draw rough outline maps; for the purpose of learning geography (says the author) elaborate map-drawing is not required, and to attempt it is a great mistake, since, besides wasting much time, it is apt to divert the attention of the pupil from that which is the main object of map-drawing—viz., to fix in the mind a clear idea of the relative situations of places—and to concentrate it upon the neat execution of the drawing on which he is engaged. Some specimens of outline maps are introduced. In the compilation of this work the author has consulted the best and latest authorities, and it will doubtless be found generally useful, whether as a text-book for schools, or as affording a speedy method of acquiring knowledge for examinations. It will be found of value as a book of reference, for it includes a general index, which contains upwards of three thousand names.

Notes.

Telegraphic Dispatch Stamps in France.—There has been a report some time afloat in Paris that it was the intention of the Government to introduce special stamps for dispatches; this will shortly become a reality; the stamps are already prepared, and specimens of them are to be seen in the Exhibition at the Champ de Mars. When a dispatch has its proper stamp attached to it it may either be thrown into a box to be provided for the purpose, at a telegraph station, or it may be sent through the post-office in an envelope stamped as a letter, and marked "Telegraphic Dispatch." Some other improvements in the telegraphic service are to be introduced at the same time, but they are not yet made known. The boldness with which reforms have been introduced into the telegraphic system of France is well justified by the results achieved; the number of private dispatches in a year having increased from 48,103 in 1852 to 2,842,554 in 1866, and it is confidently anticipated that the facilities afforded by the use of stamps, and a proposed reduction in price, will create an immense further increase.

Supply of Water to Paris.—The arrangement for completing the last link of the proposed chain has just been made by the adjudication of the contracts for the works necessary for conveying the waters of the Vanne to Paris. The estimate for these works, including pipes and other iron work, was nineteen million and a half francs (£780,000), but there were a great many tenders, and a considerable reduction is said to have been made on several items. The water of the Vanne will have to be carried across nearly the whole of the department of the Yonne, a portion of those of the Seine-et-Marne, and of the Seine, to reach the new reservoir of Montrouge, which has already been mentioned in the *Journal.*

The Universities of Italy.—The University of Salerno, the first that was founded in Europe, dates from the early part of the 12th century. The university of Bologna was founded in 1158; that of Naples in 1224; the celebrated university of Padua in 1228; that of Rome in 1245; of Pisa in 1333; Palermo in 1394; Turin in 1405; Florence in 1438; Catania in 1445; Parma in 1482; this university was reorganised in 1606. The university of Macerata was founded in 1540; that of Messina in 1548; of Mantua in 1625; in the island of Sardinia the university of Cagliari in 1720; the university of Sassari in 1765; and that of Genoa in 1812.

Patents.

From Commissioners of Patents' Journal, October 4th.

Grants of Provisional Protection.

Attire, male and female—2529—J. G. Tongue.
Baling presses—2565—J. Whittome.
Blast engines—2682—L. R. Bodmer.
Boats, baths, &c.—1627—W. Bradford.
Boilers—2557—C. J. Spencer and F. Ware.
Boilers—2722—J. H. Johnson.
Boilers, regulating supply of water, &c., to—2674—C. Ritchie.
Bread ovens—2650—S. Dreyfous.
Candle fixers—2626—J. Soames.
Candles, ornamenting—2489—A. Field and W. B. Nation.
Carding engines—2642—J. J. and E. Harrison.
Cartridge holders—2547—W. R. Lake.
Cartridges—2409—J. and F. J. Jones.
Cereals, cleaning, &c.—2640—W. W. Gibson.
Charcoal—2680—J. Blair.
Coal, separating impurities from—2678—J. Hargreaves.
Cooking apparatus—2417—H. A. Bonneville.
Cucumber box—2567—J. Pottle.
Decorative material—2632—J. Rust.
Driving bands, &c., removing and cutting the hides of animals for the manufacture of—2471—A. M. Clark.
Embroidery, appliqué—2510—A. C. Henderson.
Fabrics, finishing, &c.—1733—F. B. Baker and L. Lindley.
Fabrics, weaving ornamental—2710—A. Taylor.
Fibrous substances, dressing—2533—J. Smith.
Fire, preservation of life from—2385—W. Dixon.
Fire-arms—2672—J. R. Cooper.
Fire-arms, breech-loading—2477—W. J. Matthews.
Fire-arms, breech-loading—2513—H. Carter and G. H. Edwards.
Fire-escapes—2509—R. A. Jones and J. C. Hedges.
Fires, lighting—2614—J. C. Bayley and D. Campbell.
Fires, &c., lighting—2491—J. McKechnie.
Fish-hooks—2714—A. Morrall.
Flannels—2658—D. Howard.
Flowers and foliage, colouring artificial—2644—A. M. Clark.
Furnaces, &c.—2541—J. Whitham.
Furnaces—2553—J. Eichhorn.
Furnaces—2562—J. Eichhorn.
Furnaces—2638—H. Fisher.
Furnaces—2670—S. C. Lister.
Gas—2694—C. D. Abel.
Gas lamps, &c., lighting—2531—J. J. Hicks.
Gas, &c.—2668—A. Aitchison and H. J. Grantham.
Grain, cleaning—2702—R. Waygood.
Grass, &c., cutting—2507—J. Howard and E. T. Bousfield.
Horse collars, &c., padding for—2517—G. H. Pierce.
Iron and steel—2704—J. Bower.
Iron and steel, &c.—2596—S. Dalton.
Jute, treating—2664—J. Baird.
Kaleidoscope—2634—J. Huggins.
Lamps—2708—G. H. J. Simmons.
Lamps, &c.—2648—J. G. Tongue.
Looms—2527—T. W. Helliwell.
Looms—2624—C. Litster and G. Storey.
Lubricators—2525—T. Hodson, W. Mather, and J. Ridley.
Manganese, &c., oxides of—2501—W. Weldon.
Matches, &c.—2662—B. B. and A. B. Blackburn.
Metals, &c., cutting, &c.—2497—A. M. Clark.
Milk cans—2495—L. N. Le Gras.
Minerals, boring, cutting, &c.—2503—F. B. Dœring.
Motive-power—2523—N. Seward.
Optical apparatus—2563—C. Sutton.
Paper and paper articles—2690—J. H. Brown.
Paper bags, &c., fastenings for—2429—W. E. Newton.
Paper machines—2487—C. Tessier.
Printing machinery—2537—D. Payne.
Pumps—2716—G. Wilkinson.
Pumps, rotary—2686—H. Forbes.
Railway brakes—2483—R. Watson.
Railway buffers—2519—J. B. Handyside.
Railway carriages—2381—C. Reifert.
Railway carriages, &c., propelling—2543—C. Burn.
Railway wheels—2511—W. H. Kitson.
Railways, ventilating underground—2684—S. Bevan.
Roof and roof pavement, illuminating—2539—B. F. Stevens.
Safes, &c.—2696—D. R. Ratcliff.
Safety lamps—2521—H. Gardner.
Screw-cutting and turning apparatus—2720—A. V. Newton.
Sewing machines—2636—T. Bletcher.
Ships' cables, stoppers for—2545—A. Paul.
Ships' propellers—2473—I. Dixon.
Ships' rudders, fitting—2555—J. Medhurst.
Snow, removing—2499—G. Crane.
Steam engines—2535—J. Armstrong and E. Eccleston.
Steam hammers—2676—J. Fletcher.
Stone-cutting tools—2485—A. V. Newton.
Telegraph conductors, testing—2622—F. H. Varley.
Thermometer—2561—C. E. Brooman.
Vegetable drying oils, treating the residuum which results from the clarification of—2656—G. E. Marchisio.
Vegetable substances, obtaining extracts from—2493—P. F. Lunde.
Water-closets—2688—G. Batcheldor.
Water meters—2700—G. Clayton and W. Marbeck.
Water, raising—2718—J. Brunton.
Wheat, &c., hulling—2508—G. A. Buchholz.
Wheels, &c., securing—2515—J. Ford.
Window sash fasteners—2481—E. K. Dutton.
Window sashes, &c.—2712—J. Syme.
Xyloidine, treating—2666—D. Spill.

Inventions with Complete Specifications Filed.

Blast furnaces or cupolas—2745—T. Prideaux.
Fibrous materials, spinning—2758—H. A. Bonneville.

Patents Sealed.

1019. W. Tatham & W. T. Heap.
1021. J. G. Tatters.
1022. T. B. Marshall.
1036. T. H. Lucas.
1040. C. E. Brooman.
1041. J. Drew, E. Southwell, and H. White.
1042. W. Henderson.
1043. J. Barker.
1048. W. T. Henley.
1049. W. T. Henley.
1052. C. E. Brooman.
1053. G. Little.
1059. H. Forbes.
1060. A. Morel.
1061. T. Redmayne and J. Sibrey.
1070. W. C. Cambridge.
1103. J. Jobson.
1132. J. S. Brookes.
1207. J. W. Burton.
1239. M. A. F. Mennons.
2134. W. R. Lake.
2191. W. R. Lake.
2214. W. R. Lake.
2345. J. Peacock.

From Commissioners of Patents' Journal, October 8th.

Patents Sealed.

1057. W. N. Wilson.
1062. F. Waller.
1066. J. R. Napier and W. J. M. Rankine.
1071. F. G. Fleury.
1072. A. C. Kirk.
1075. S. Smith.
1076. S. Barlow and T. Edmeston.
1079. J. Higgins and T. S. Whitworth.
1080. W. Clark.
1081. G. Slater.
1093. C. H. Gardner and J. Bickerton.
1096. W. Clark.
1098. R. Shortrede.
1106. R. S. M. Vaughan and A. G. Harston.
1107. C. Crockford.
1111. A. A. Langley.
1127. T. W. Gray.
1128. W. Weild.
1136. A. N. Wornum.
1137. W. Cochrane.
1138. T. Horsley.
1160. J. Atkinson.
1183. J. Haworth.
1377. W. E. Newton.
1548. G. Howard.
1931. J. Somerville & R. Elsdon.
2199. J. B. A. Menage.
2279. R. H. Michell.

Patents on which the Stamp Duty of £50 has been Paid.

2424. W. Clark.
2569. J. Zeh.
2442. G. T. Bousfield.
2540. O. L. Hopson and H. P. Brooks.
2473. C. Chapman.

Patents on which the Stamp Duty of £100 has been Paid.

2429. D. Cope.
2460. J. Ramsbottom.

Registered Designs.

4880—September 11th—A double-acting field or other gate or door latch—W. Baylis, Wolverhampton.
4881—September 12th—Handkerchief box—H. Malier, Belfast.
4882—September 13th—Gas cooking apparatus—S. Leoni, 34, St. Paul's-street, New North-road, N.
4883—September 16th—Metallic bedstead—J. Wadsworth, Birmingham.
4884—September 17th—Metallic bedstead—Key and Hoskyns, Brodsley, Birmingham.
4885—September 23rd—A gentleman's paper or paper-cloth collar—C. Potter, Milk-street, E.C.
4886—September 23rd—Leather strap or band—Dr. Millar, M.D., Gloucester House, Southsea.
4887—September 24th—Rack pulley—H. Frantry, Birmingham.
4888—September 25th—Clip or banner screen arm and other articles—T. Pemberton and Son, Birmingham.
4889—September 28th—A ladies' collar—R. Young, Cripplegate-buildings, City, E.C.